

Pandemic Planning for Telecommunications Services

Prepared by the Telecommunications Carriers' Forum

Pandemic Planning Working Group

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1. Introduction

This report summarises the outcome of an assessment of the service supply capabilities of the telecommunications industry during a pandemic.

The assessment is based on data collected via a questionnaire developed by the MED and the Telecommunications Carriers Forum – Pandemic Planning Working Group (TCF). The questionnaire was sent to telecommunications service providers and responses were received from the carriers, large ISPs and a very limited number of the small / niche ISPs.

2. Industry Structure

Telecom is the only company operating a nationwide fixed telephone access network. TelstraClear covers significant parts of Christchurch and Wellington plus many metropolitan and provincial CBD areas. Both also operate significant international and intercity networks.

Telecom and Vodafone both operate their own cellular telephone network with national population coverage for the supply of mobile services.

TeamTalk operates a land mobile radio network that is used by the Fire Service, a number of ambulance services, public utilities, ports, airports, transport operators, and taxis companies. Their service is complimented by a small number of regional service providers

There are over 80 Internet service providers (ISPs) that provide Internet access and email services via dial-up and broadband. Some ISPs also supply telephone services. Telecom, TelstraClear, together with a small number of second tier companies, cover more than 80% of the Internet market.

3. Assumptions

This analysis was based on the assumptions provided in the MED's Planning Guide for Infrastructure Providers¹ and MoH advice that businesses should plan for up to 50% staff absences for periods of about two weeks at the height of a severe pandemic wave, and lower levels of staff absence for a few weeks either side of the peak. Overall a pandemic wave may last about 8 weeks and the MoH notes that the pandemic may come in waves of varying severity over time².

In addition to staff absences due to a number of reasons the movement of people may be affected by "movement restrictions" and public transport disruptions.

Therefore the industry has assumed the following traffic impacts on the various public telecommunications services:

- a) residential telephone traffic is expected to increase by 30% (caused by call-forwarding and people working from home);
- b) long distance business traffic is expected to increase by 20% (caused by travel restrictions);

¹ Version 9 MED October 2005

² A pandemic could last many months and may contain peaks followed by periods of reduced illness. The 50% is an estimate of staff absences at peaks of a significant pandemic.

- c) residential email traffic is expected to increase as corporate email systems are reconfigured to automatically forward email to residential mailboxes and more email is sent by people tele-working from home; and
- d) business activity remaining at pre-pandemic levels (although it is possible that business activity will reduce during a pandemic).

4. Telecommunications Service Capability

The following assessment of industry capabilities for supplying telecommunications services is made based on the Assumptions listed in Section 3.

4.1 Fixed telephone networks

Typically telephone networks are designed to carry the forecast load for the busy hour of the busy season. This incorporates a level of “tolerated congestion”. This practice means that significant capacity is available for evening social traffic peaks that also services business traffic during the day. Therefore the industry expects that the telephone network can generally be expected to accommodate the assumed increase in load in all but the busiest times of the year (pre Christmas and Easter). However, there could be scattered congestion.

If congestion were to occur, telephone companies have very limited ability to prioritise telephone traffic. It is possible however to prioritise 111 calls and traffic from essential service providers (provided that this traffic has been identified by the essential service provider prior to the event). It is not possible to prioritise other traffic such as business traffic. This traffic and all other traffic would be subject to industry standard control measures such as restricting calls to particular destinations and call gapping³.

Some scattered congestion is possible in the supply of service for local, national and international telephone calling. Congestion could occur in:

- a) areas where a need for expanding network capacity has been identified but has yet to be implemented;
- b) some smaller exchanges that are less tolerant to higher call loadings; and
- c) the access networks rather than in the intercity (trunk) network. i.e. it is possible that some local lines connecting to long distance lines could overload at times.

4.2 Mobile telephone networks

Mobile telephone voice networks are designed for busy hour or peak traffic loadings with a just in time goal. This means that the mobile voice networks do not have large reserves of spare capacity. Although mobile telephone voice services typically overload during a mass disaster due to bursts of instantaneous peak calling, it is questionable whether such peak volumes would occur during a pandemic due to its comparatively slower onset and longer duration.

Increased network loading from greater residential use can be expected, however, to cause significant congestion at some local cell sites.

Both Telecom and Vodafone potentially have the ability to expand residential area cell site capacity temporarily by relocating equipment from CBD area cell sites. Implementation

³ The call gapping facility allows an operator to reject a preset proportion of originated calls at a telephone exchange.

would depend on staff availability and the risk of reconfiguration work causing unexpected outages.

Mobile phone companies have very limited ability to prioritise telephone traffic. They prioritise 111 calls. All other traffic (including business traffic) would be subject to industry standard control measures such as restricting calls to particular destinations and call gapping. The following table summarises the expected impact.

Service type	Possible impact on service supply
Mobile voice	Significant congestion for mobile voice calling from residential areas for initial days. Congestion then expected to be moderate to mild in certain areas.
Mobile text	Moderate congestion. Some delay in receiving text messages, however this is not likely to be large.
Mobile data	Significant decrease in speed in initial days until mitigation tools can be put in place. Mild to Moderate speed degradation expected after the initial period.

4.3 Land Mobile Radio Service

Land mobile radio service or dispatch radio service is used for fleet communications and is fundamental to coordinating responses by emergency service providers such as police, fire, and ambulance.

Many of the key users of land mobile radio service supplied over public networks have dedicated channels and can be expected to have protocols in place to manage their traffic in the event of an emergency situation. Whilst congestion can occur in the shared channels, it is expected to be offset in most cases by reduced traffic volumes as general activity decreases.

As the users of the various trunked mobile radio systems are generally business's, there is not expected to be any significant impact on coverage or congestion. Those public utilities, emergency services and security companies requiring priority access to the networks should already have the facility in place. Any requiring such facilities should contact their service provider without delay.

4.4 Internet and email

ISPs typically provide access to the Internet and other services such as email. The following table summarises the expected impact on these services.

Service type	Possible impact on service supply
Email	Some congestion possible as traffic migrates from corporate servers to employee ISPs.
Dial-up Internet access	Some congestion possible as ISPs have a finite number of incoming lines. Increased calling may affect smaller residential ISPs more than ISPs that have a mixed business and residential customer base.
Broadband Internet access	A significant reduction in speeds is possible as customers compete for bandwidth.

4.5 Operator services

Telephone companies use Operators to provide services such as:

- a) 111 emergency call service;
- b) Directory services, including faxed based services for people with a hearing disability; and
- c) Calling assistance (primarily international assistance).

The following table summarises the expected impact on these services.

Service type	Possible Impact on service supply
111 service	It is likely there will be a significant increase in the number of genuine 111 calls. Telecom advises that the continuance of the service will be given a top priority, but notes that should a flu virus prove to be acutely virulent then the staffing of these centres would require most careful management.
Other operator services (International and national calling and directory services)	These services could be severely impacted by staff shortages.

4.6 Service delivery and restoration

Carriers and ISPs support their customers through a mix of sales and service call centres, back-office operations and several hundred field staff. These people advise customers, take orders, configure and activate equipment, repair cables and other equipment, respond to billing inquires etc. The following table summarises the expected impact on these services.

Service type	Possible Impact on service supply
Service delivery and changes to existing service (new connections, changes to services, etc)	Very limited availability in many areas that are serviced by remote field staff.
Service restoration	Adequate support for core network services but we would expect that the repair of "single line" residential faults could be significantly delayed.
Support services / help desks	Very limited availability.

4.7 Other issues

4.7.1 Network operations centres

All carriers have some form of centralised network operations centre. In general these are staffed by a small number of key very experienced people. Network operators will need to carefully manage these teams to ensure that a skeleton presence is maintained.

4.7.2 Back-up supplies

Whilst operators have diesel powered back-up supplies at major network nodes many small nodes, cabinets and cell sites rely on batteries for backup. These have a finite capacity and service could be disrupted in the event of a prolonged power outage. In addition network operators will require access to diesel supplies to maintain their back-up generators.

It is not known what back up power supplies are in place at some of the smaller ISPs.

A small number of key sites also require secure water supplies for staff amenities and essential equipment cooling systems.

5. Conclusions

Whilst it is very difficult to provide a detailed assessment of the precise impact of a pandemic the following high-level conclusions can be drawn from the data that has been provided by the carriers:

- 5.1 All service providers rely on a small number of key people at their network management centres. Operators will need to carefully manage these groups to ensure that a skeleton presence can be maintained.
- 5.2 The fixed telephone network is robust and carriers have comprehensive traffic management tools and management experience.
- 5.3 The mobile telephone network may suffer significant congestion as users stay at home in the initial days of a pandemic, however the impact is likely to be minor to moderate after mitigation tools have been put in place. Mobile carriers have limited options to minimise the impact of the traffic that has moved from business locations to residential locations but can use mitigation tools available in response.
- 5.4 The impact on residential email and Internet access services is hard to assess. However, service providers have few tools to manage either Internet or email traffic. These services are:-
 - a) growing rapidly (service providers typically add capacity on a just in time basis);
 - b) typically engineered on a best efforts basis; and
 - c) vulnerable to spam and virus attacks.
- 5.5 Service providers are likely to have difficulty responding to new service requests if a pandemic occurs. Therefore businesses must install alternative call answering systems and remote working facilities now (both the business end and the residential end).
- 5.6 Service provider help desks could be understaffed and they may not be able to support users who are unfamiliar with say remotely accessing their company's email system.
- 5.7 Most carriers rely on a wide range of contractors to provide essential services and they could be prevented from performing these services unless a generally recognised formal protocol is established to enable their staff to cross internal borders.
- 5.8 Businesses should plan and install now:
 - a) remote working facilities (both the business end and the residential end). They should regularly train / test / exercise these plans as it will be too late when the pandemic arrives. In addition they should carefully consider the risks associated with a solution that relies entirely on Internet access; and
 - b) alternative call answering facilities, such as call forwarding, which can be activated in the event of a pandemic.